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UNDERWATER INSPECTION PLAN(U) NAVAL FACILITIES
ENGINEERING COMMAND WASHINGTON DC CHESAPEAKE DIV
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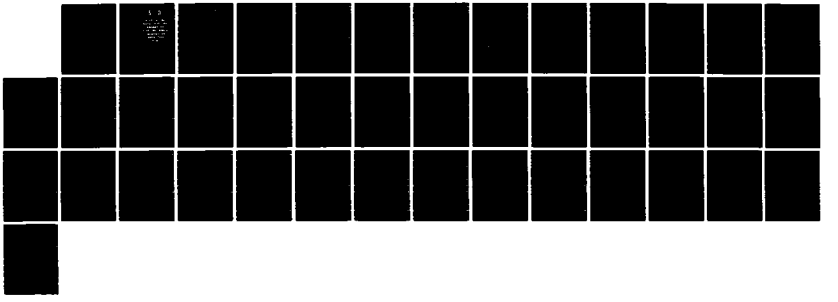

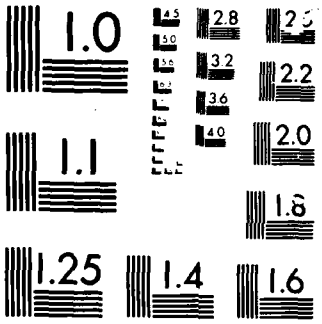

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PUGET SOUND NAVAL SHIPYARD BREMERTON FLEET MOORINGS UNDERWATER INSPECTION PLAN

MAY 1983

OCEAN ENGINEERING
AND CONSTRUCTION PROJECT OFFICE
CHESAPEAKE DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
WASHINGTON, D.C. 20374

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As part of COMNAVFACENGCOM's Fleet Mooring Maintenance (FMM) Program, CHESNAV-FACENGCOM has been assigned the responsibility to conduct the underwater inspections of fleet moorings worldwide. This plan provides guidelines for the underwater inspection of 11 fleet moorings operated and maintained (Con't)

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by the Puget Sound Naval Shipyard (PSNSY), Bremerton, WA. The inspection is scheduled to take place during the mid-August time frame.

CHESNAVFACENGCOM has designated an Engineer-in-Charge (EIC) to provide on-site technical guidance to Underwater Construction Team Two (UCT 2) which was tasked by CINPACFLT message 210331Z August 1982 to perform the underwater portion of the inspection. In addition, the EIC will prepare the post inspection report which will include the results of the inspection and recommendations for required maintenance actions.

FLEET MOORING INSPECTION PLAN

PUGET SOUND NAVAL SHIPYARD

MAY 1983

OCEAN ENGINEERING AND CONSTRUCTION
PROJECT OFFICE

CHESAPEAKE DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
WASHINGTON D.C. 20374

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Officer in Charge
UCT TWO

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PUGET SOUND NAVAL SHIPYARD
UNDERWATER INSPECTION PLAN

1.0 BACKGROUND

As part of COMNAVFACENGCOM's Fleet Mooring Maintenance (FMM) Program, CHESNAVFACENGCOM has been assigned the responsibility to conduct the underwater inspections of fleet moorings worldwide. This plan provides guidelines for the underwater inspection of 11 fleet moorings operated and maintained by the Puget Sound Naval Shipyard (PSNSY), Bremerton, WA. The inspection is scheduled to take place during the mid-August time frame.

CHESNAVFACENGCOM has designated an Engineer-in-Charge (EIC) to provide on-site technical guidance to Underwater Construction Team Two (UCT 2) which was tasked by CINCPACFLT message 210331Z August 1982 to perform the underwater portion of the inspection. In addition, the EIC will prepare the post inspection report which will include the results of the inspection and recommendations for required maintenance actions.

2.0 PROJECT RESPONSIBILITIES

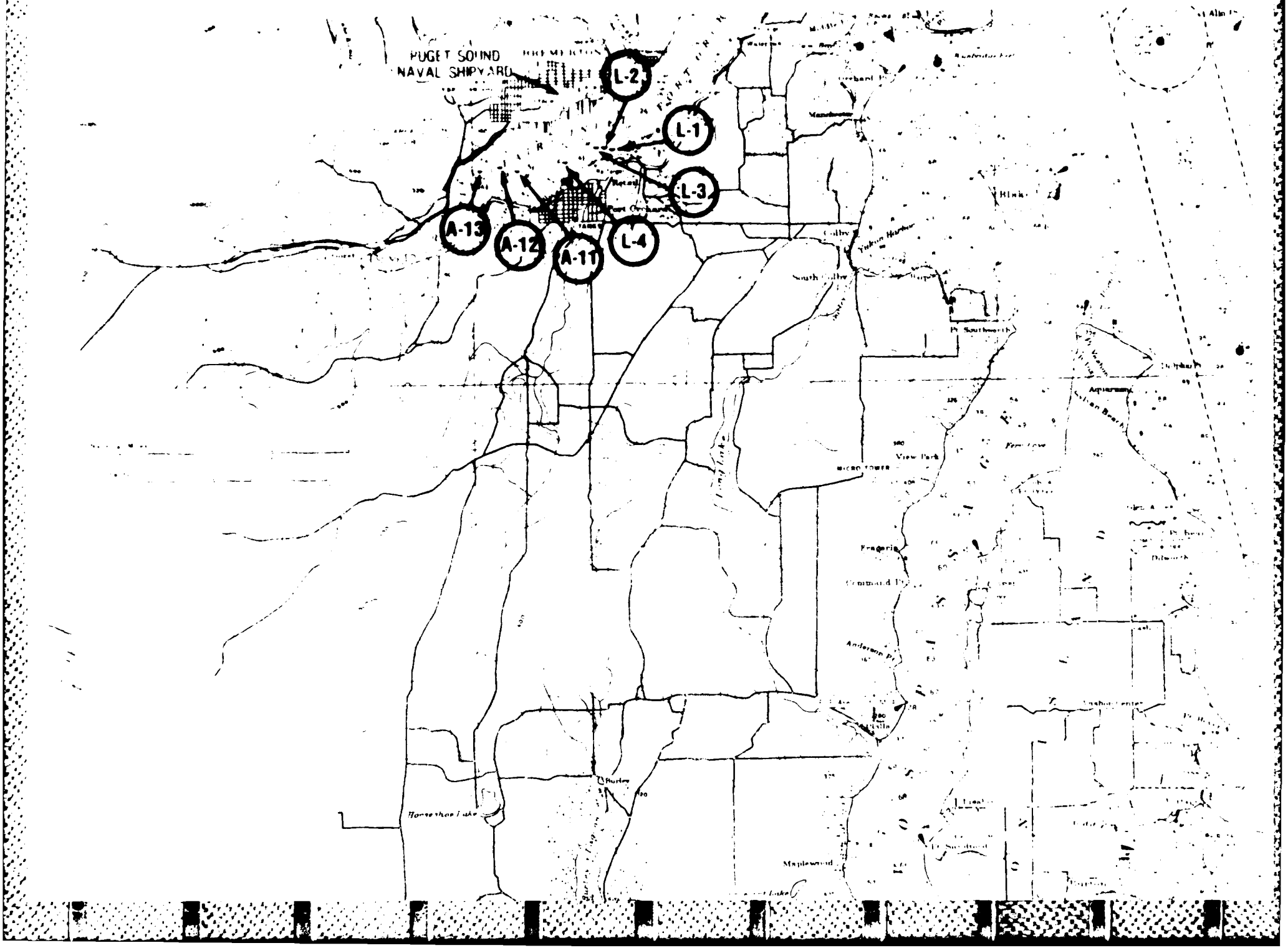
CHESNAVFACENGCOM will develop the FM underwater inspection plan, provide technical assistance to the dive team, prepare the required inspection forms, evaluate the observed inspection data, and report the results of the inspection to interested activities.

UCT 2 will provide sufficient divers to accomplish the inspection within the allotted time frame, gather and accurately report all required data, and ensure that the required amount of diving support material/equipment is available. UCT 2 divers will perform the underwater inspection in accordance with this plan and collect the data specified in paragraph 4.0.

The activity responsible for the moorings being inspected will provide logistics support as required by the Engineer-in-Charge and the UCT dive team.

3.0 GENERAL MOORING HISTORY

PSNSY Bremerton currently operates and maintains 11 fleet moorings: three A, seven F, and one unreported class of mooring (Buoy X). In addition, PSNSY maintains one A and three F class moorings in storage ashore as spares. All of the in-water moorings are riser-type. Figure 1 shows the geographic positions


PUGET SOUND
NAVAL SHIPYARD
L-2
L-1
L-3
L-4
A-13
A-12
A-11

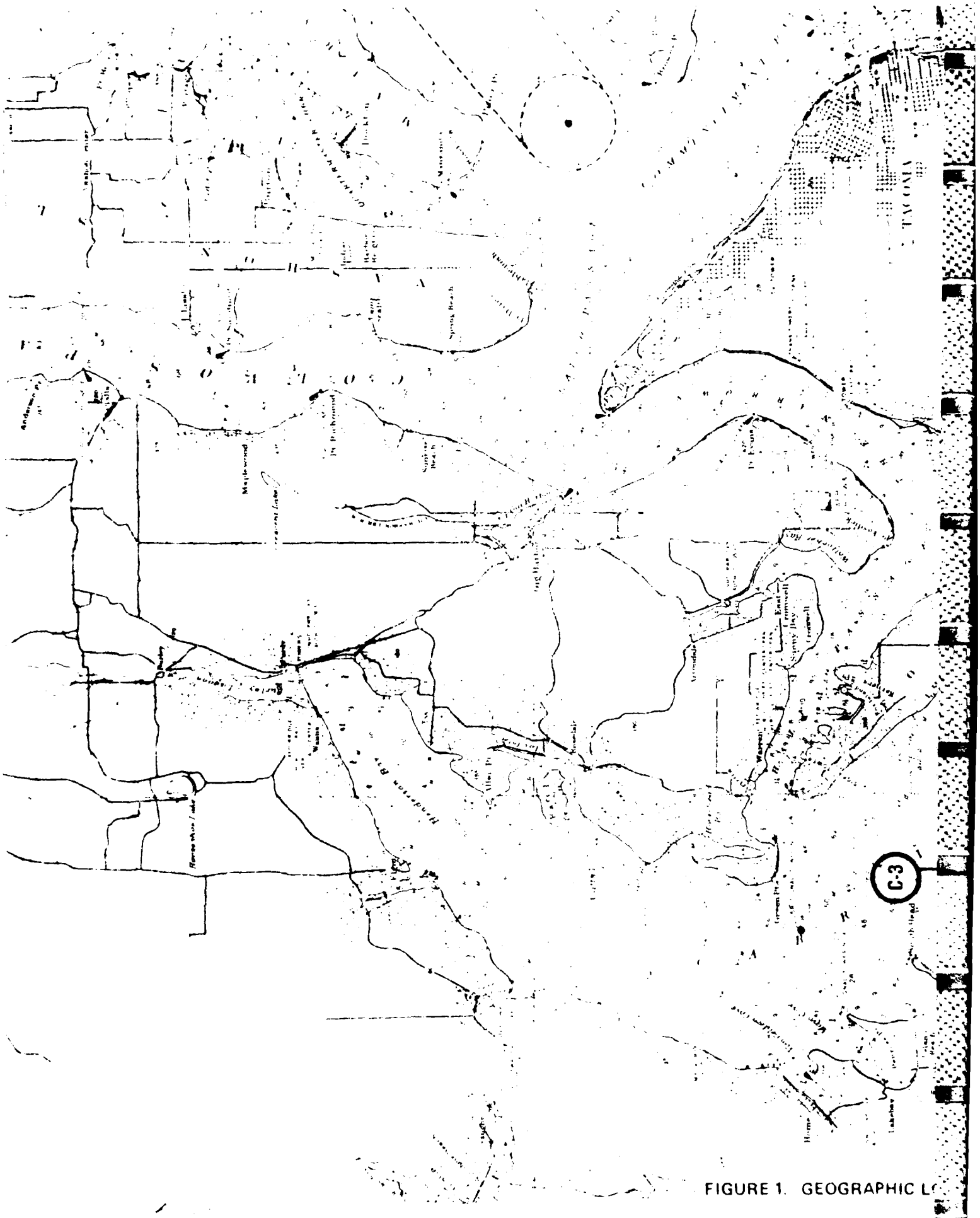


FIGURE 1. GEOGRAPHIC L

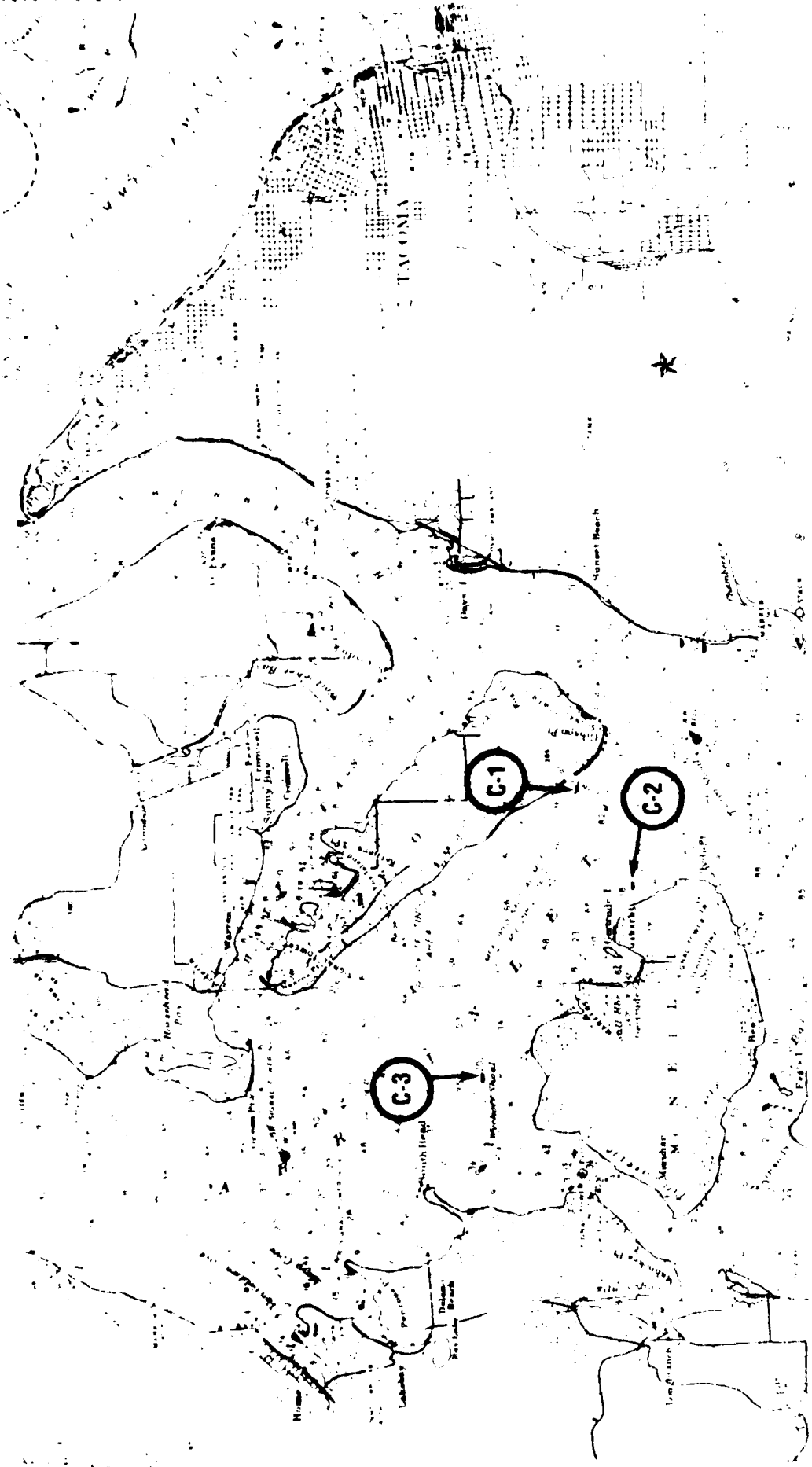


FIGURE 1 GEOGRAPHIC LOCATIONS OF FLEET MOORINGS

of the PSNSY Bremerton fleet moorings. This figure does not show the position of the Buoy X mooring. However, this mooring will be removed from service during the fourth quarter of FY 83.

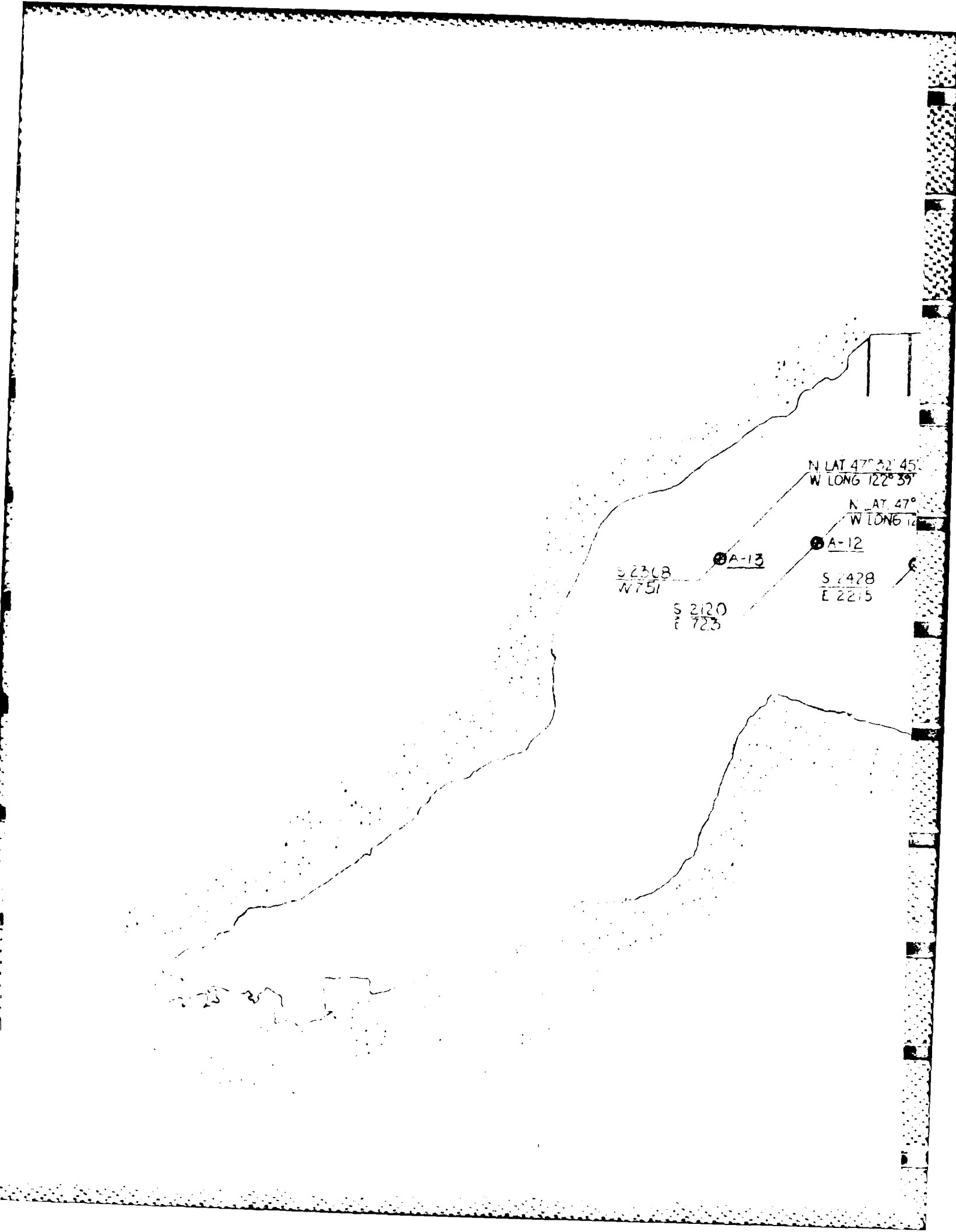
Figure 2 is an enlargement of Sinclair Inlet with the positions of its seven installed moorings while Figure 3 is an enlargement of Carr Inlet showing the positions of three of the F class moorings.

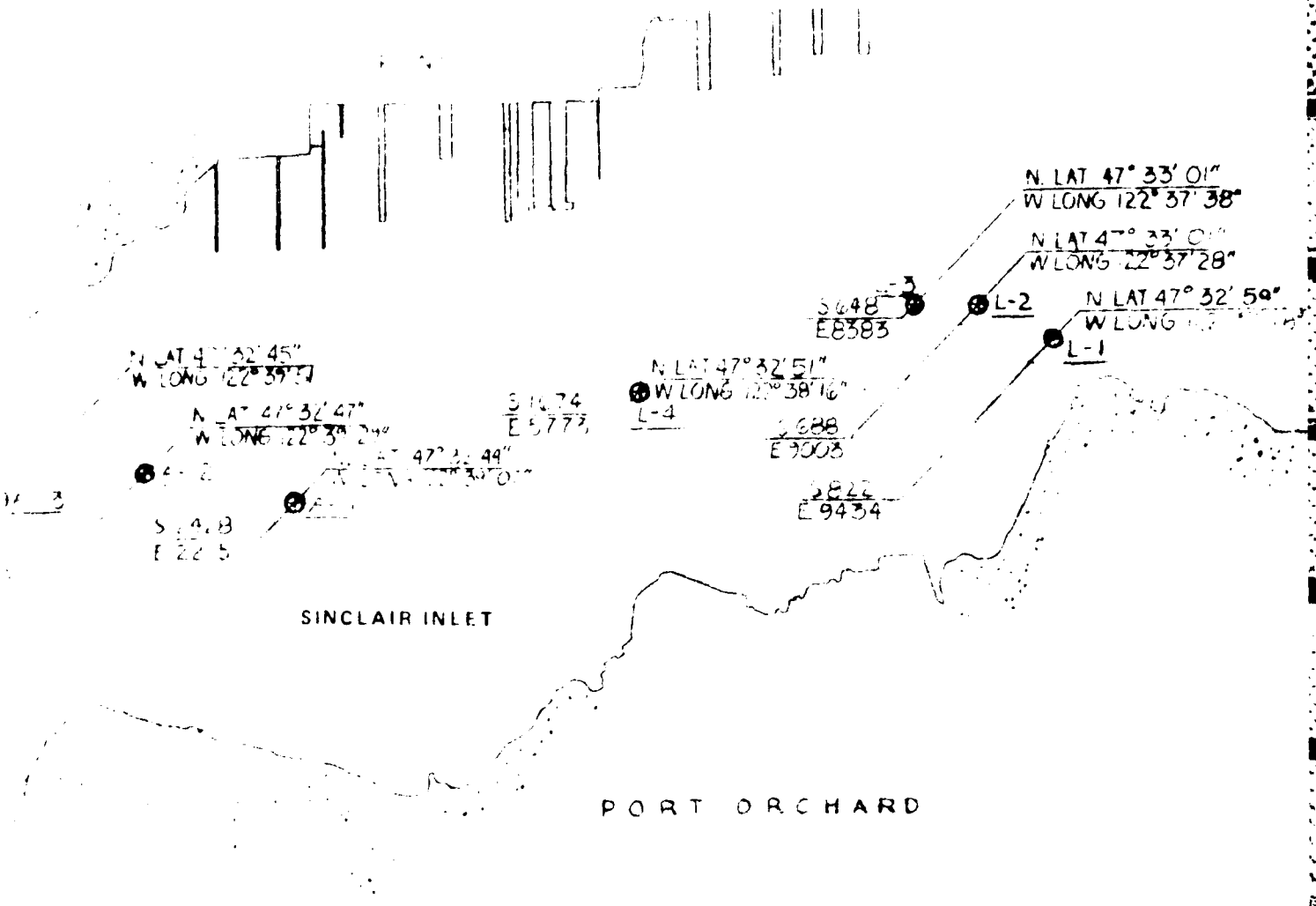
Table 1 contains information concerning PSNSY's mooring numbers, classes, locations, and water depths while Table 2 contains the latest maintenance history of these moorings. Although Table 2 indicates that there is no cathodic protection system on any of the installed moorings, Figures 4 and 5 (as-built schematics of both classes of moorings) show that anodes are typically inserted in risers and ground legs.

4.0 INSPECTION PROCEDURES

4.1 Inspection Objectives. The purpose of mooring inspections is to determine the general physical condition of buoys and chain assemblies and, when possible, to verify or update existing as-built and maintenance records. Divers inspect only a portion of the submerged buoy hull and chain assemblies in order to compile a general description of the mooring's condition. The existence of fairly consistent measurements during this inspection provides a good indication of the mooring's overall condition. It should be kept in mind that periodic underwater inspections are intended as an expedient and relatively inexpensive supplement to accurate maintenance records. As such, they cannot fully substitute for a complete inspection involving recovery of the mooring and the measurement and evaluation of each component.

One of the more important parameters used to evaluate the condition of a mooring is chain wire diameter. After cleaning to bare metal, a selective sampling of the wire diameter of chain links and connecting hardware is taken in order to determine the amount of deterioration due to corrosion and wear. "Single Link" measurements are taken where chain is slack, and detect only corrosion loss. "Double Link" measurements, taken where two links connect under tension, detect the combined effects of corrosion and wear. Chain links and other components which measure 90% or greater of original wire diameter are considered to be in "good" condition; measurement between 80% and 90% of original diameter is considered "fair" condition and is cause for the mooring to be downgraded in classification; any measurement less than 80% is considered "poor" and is cause for the mooring to be declared unsatisfactory for fleet use. Figure A-1 in Annex A depicts the proper method of taking both single and double link measurements.


N LAT 47° 32' 45
W LONG 122° 39'
N LAT 47°
W LONG 12
A-12
A-13
S 2368
W 751
S 2120
E 723
S 2428
E 2215



SITE PLAN

FIGURE 2. SINCLAI

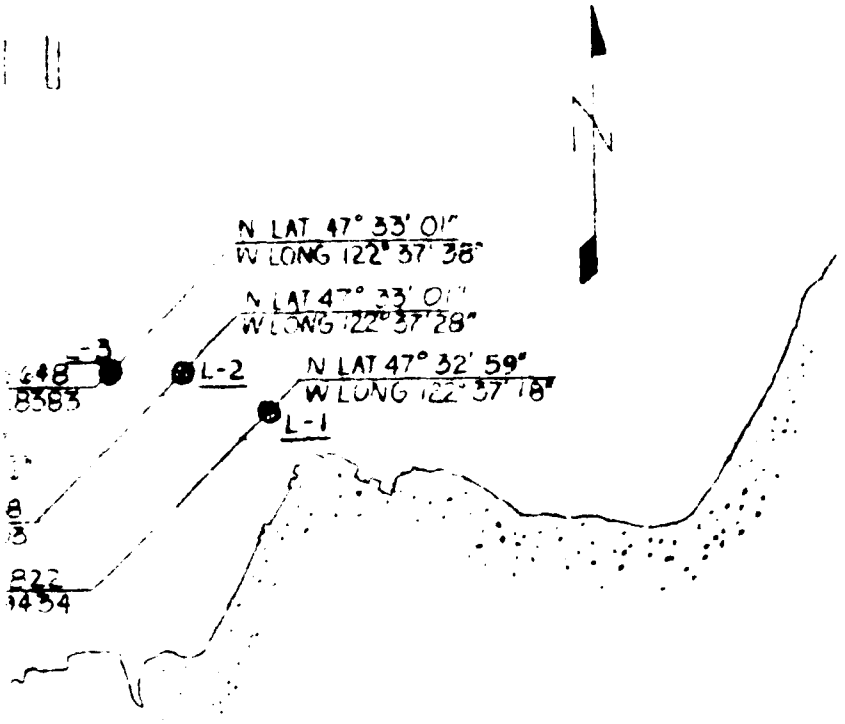


FIGURE 2. SINCLAIR INLET MOORINGS

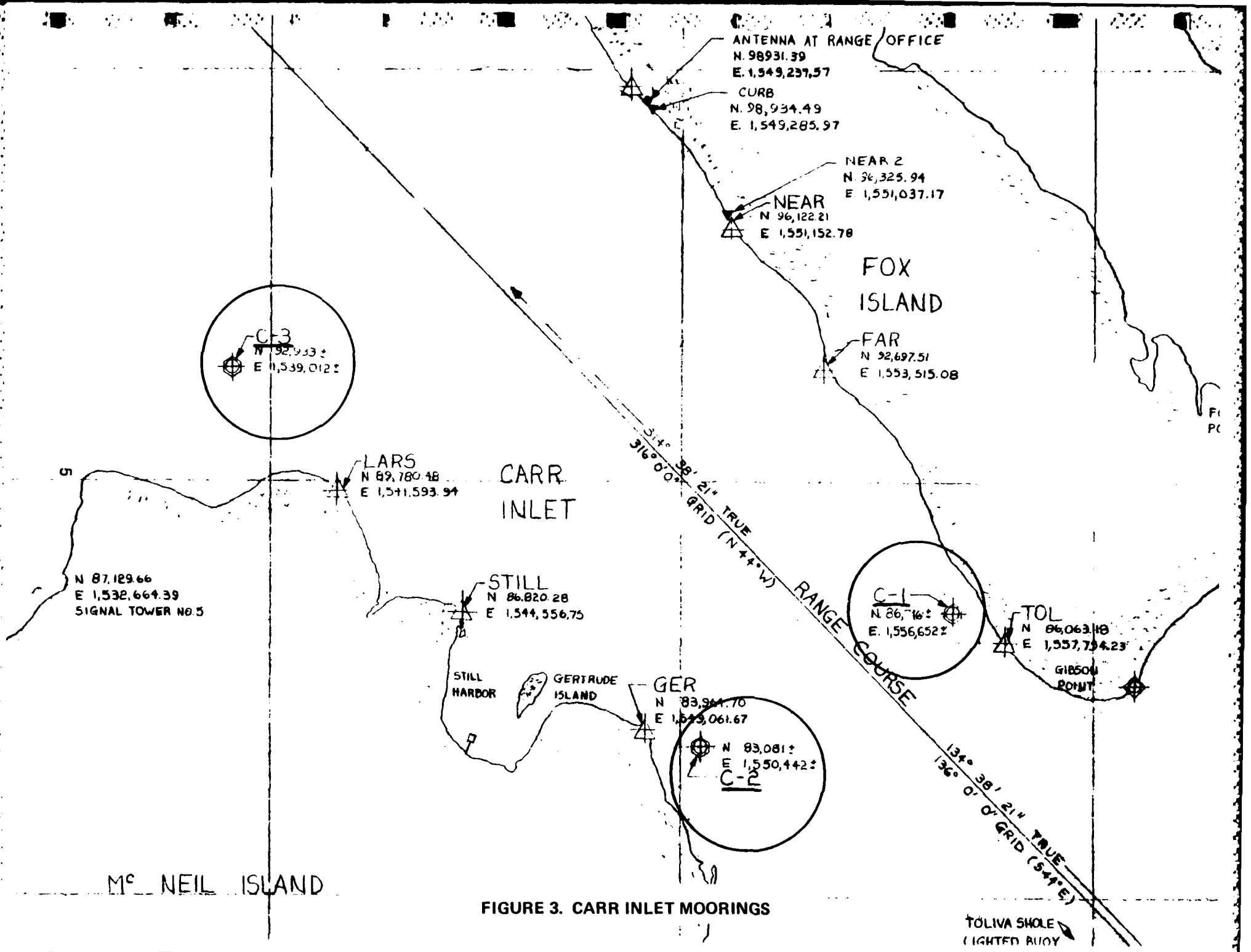


FIGURE 3. CARR INLET MOORINGS

TABLE 1. PSNSY BREMERTON FLEET MOORINGS

Mooring Number	Mooring Class	Location	Water Depth (Ft)	Last Repair	Last Reported Condition
A-10	A	Ashore	–	–	–
A-11	AR	Sinclair Inlet	31	1974	Fair
A-12	AR	Sinclair Inlet	33	1975	Fair
A-13	AR	Sinclair Inlet	33	1975	Fair
C-1	FR	Carr Inlet	212	1977	Fair
C-2	FR	Carr Inlet	315	1975	Fair
C-3	FR	Carr Inlet	95	1975	Fair
L-1	FR	Sinclair Inlet	55	1974	Fair
L-2	FR	Sinclair Inlet	50	1974	Fair
L-3	FR	Sinclair Inlet	94	1975	Fair
L-4	FR	Sinclair Inlet	45	1976	Fair
L-5	F	Ashore	–	–	–
L-6	F	Ashore	–	–	–
L-7	F	Ashore	–	–	–
X	UNK	UNK	UNK	1975	Fair

NOTE: Copy of Enclosure (1) to Commander, Puget Sound Naval Shipyard letter 422.3 dated 9 April 1982

TABLE 2. FLEET MOORING MAINTENANCE HISTORY

DATE MAY 12 1983
SHEET NO.

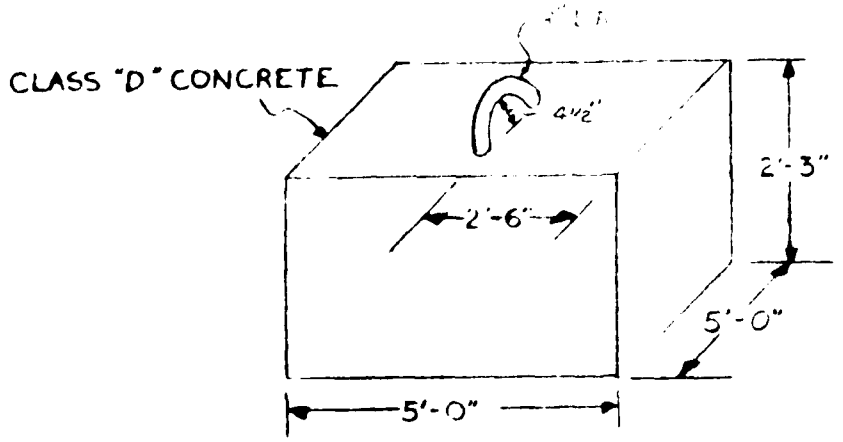
BUOY	LOC	YEAR INSTALLED	CATHODIC PROTECTION	PAST INSPECTION, REPAIR, AND OVERHAUL 73	74	75	76	77	78	79	80	81	82	BUOY CONDITION	PLANNED WORK 1983	FUTURE SCHEDULED BUOY MAINTENANCE 84	85	86	87
A-11	SINCLAIR INLET	1940	N	—	O	—	I	R	—	I	R	—	—	FAIR	I	O	—	I	R
A-12		1940	N	—	I	R	—	I	R	—	I	DEF	O	FAIR	—	I	R	—	I
A-13		1940	N	—	I	R	—	I	DEF	R	—	DEF	I	FAIR	O	—	I	R	—
L-1	SINCLAIR INLET	1940	N	I	R	—	I	O	—	I	R	—	—	FAIR	I	R	—	I	O
L-2		1940	N	I	R	—	DEF	I	O	—	I	—	—	FAIR	R	—	I	R	—
L-3		1940	N	—	I	R	—	I	O	—	I	—	—	FAIR	R	—	I	R	—
L-4		1940	N	O	—	I	R	—	I	R	—	DEF	I	FAIR	O	—	I	R	—
X			N	—	I	R	—	I	DEF	R	—	DEF	I	FAIR	REM				
C-1	CARR INLET	1954	N	O	—	I	R	—	I	R	—	DEF	I	FAIR	O	—	I	R	—
C-2		1954	N	—	I	R	—	I	R	—	I	DEF	O	FAIR	—	I	R	—	I
C-3		1954	N	—	I	R	—	I	R	—	I	DEF	O	FAIR	—	I	R	..	I

LEDGER: I = INSPECTION; R = REPAIR; O = OVERHAUL; REM = REMOVE; N = NONE; — NO ACTION

DEF = DEFERRED WORK

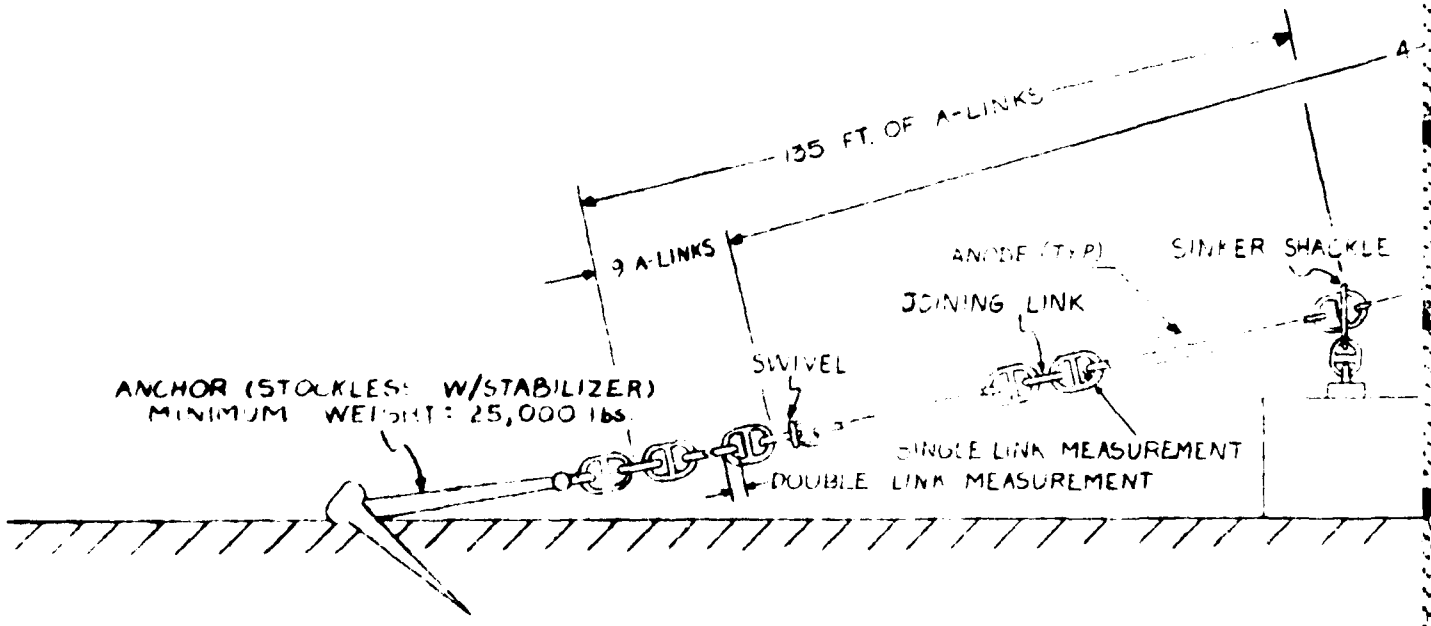
ENCLOSURE 1

NOTE: Copy of Enclosure (1) to Commander, Puget Sound Naval Shipyard ltr ser 654-83, dated 12 May 83



DETAIL "A" - SINKER

MINIMUM WEIGHT: 8200 lbs
NOT TO SCALE



CLASS A MOORING SYSTEM

NOT TO SCALE

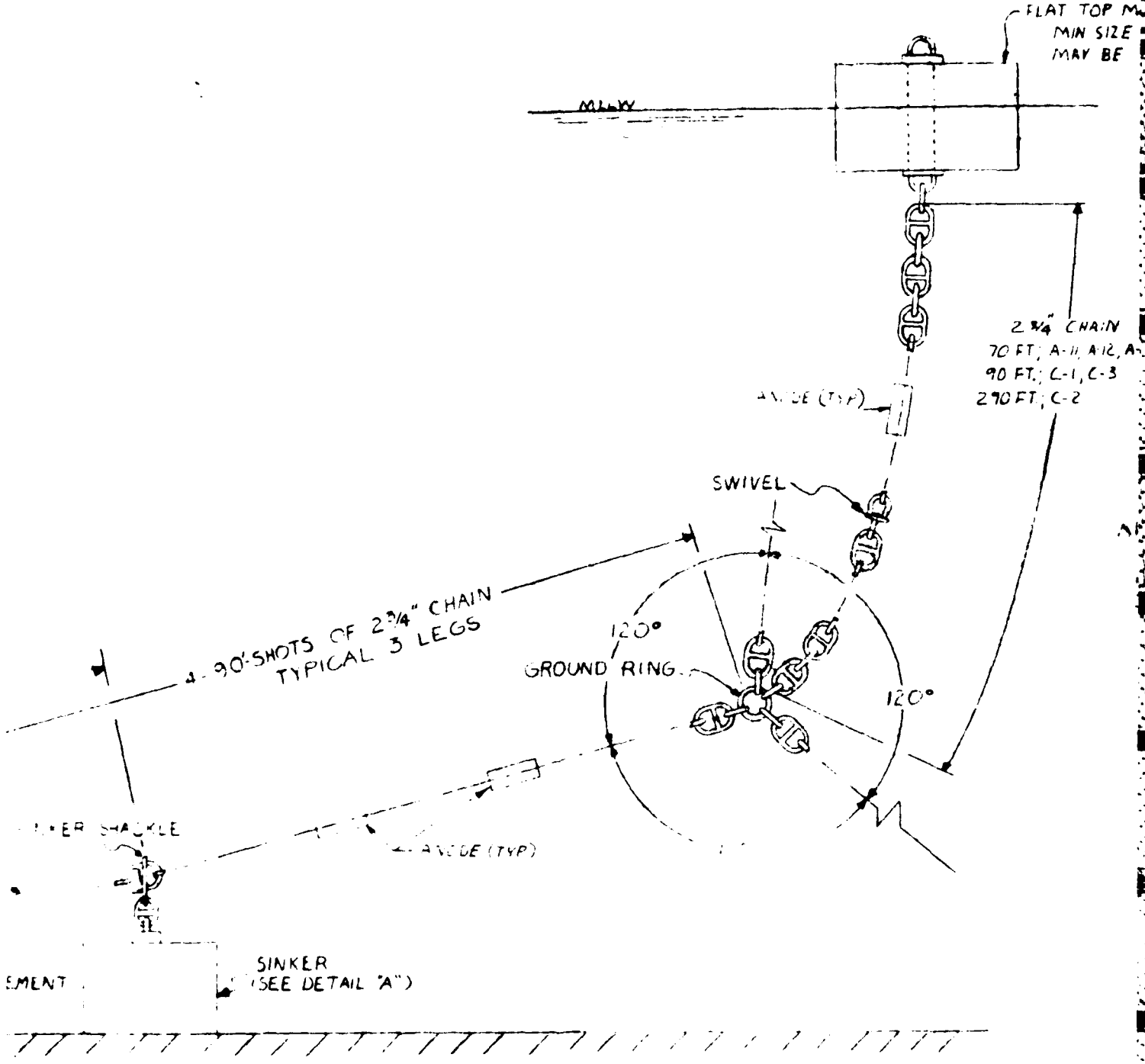


FIGURE 4 PSNSY CLASS A MOOR

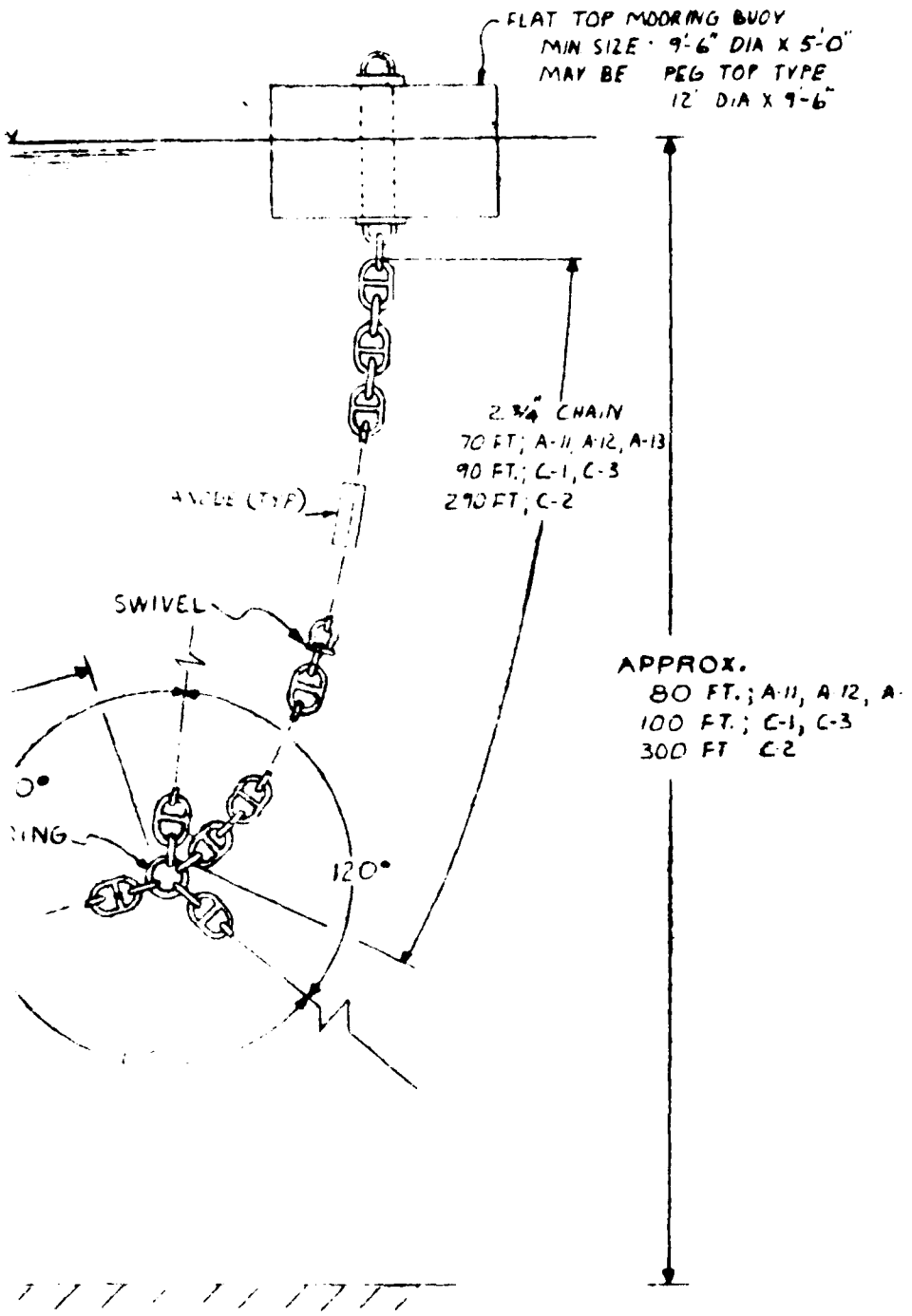
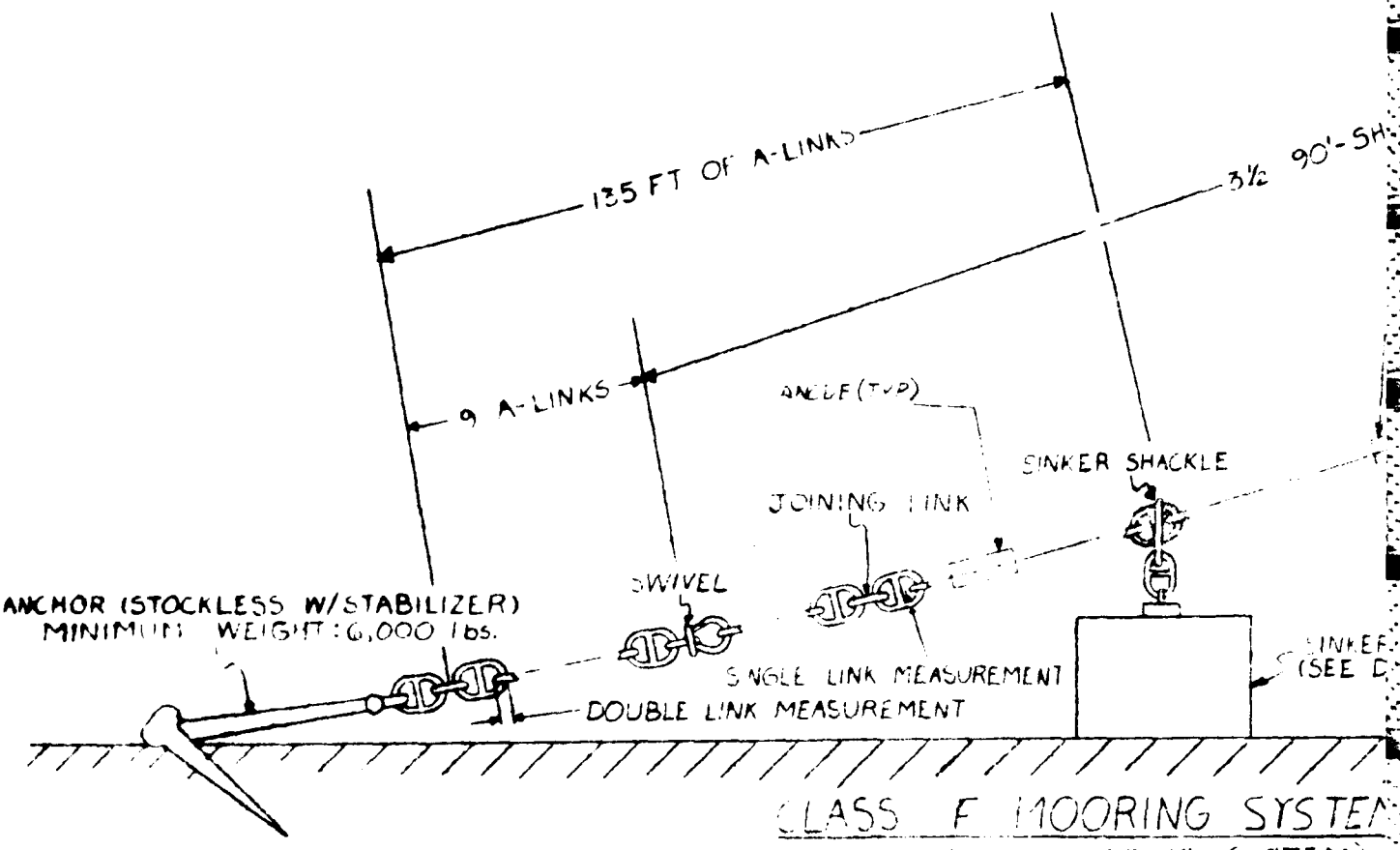


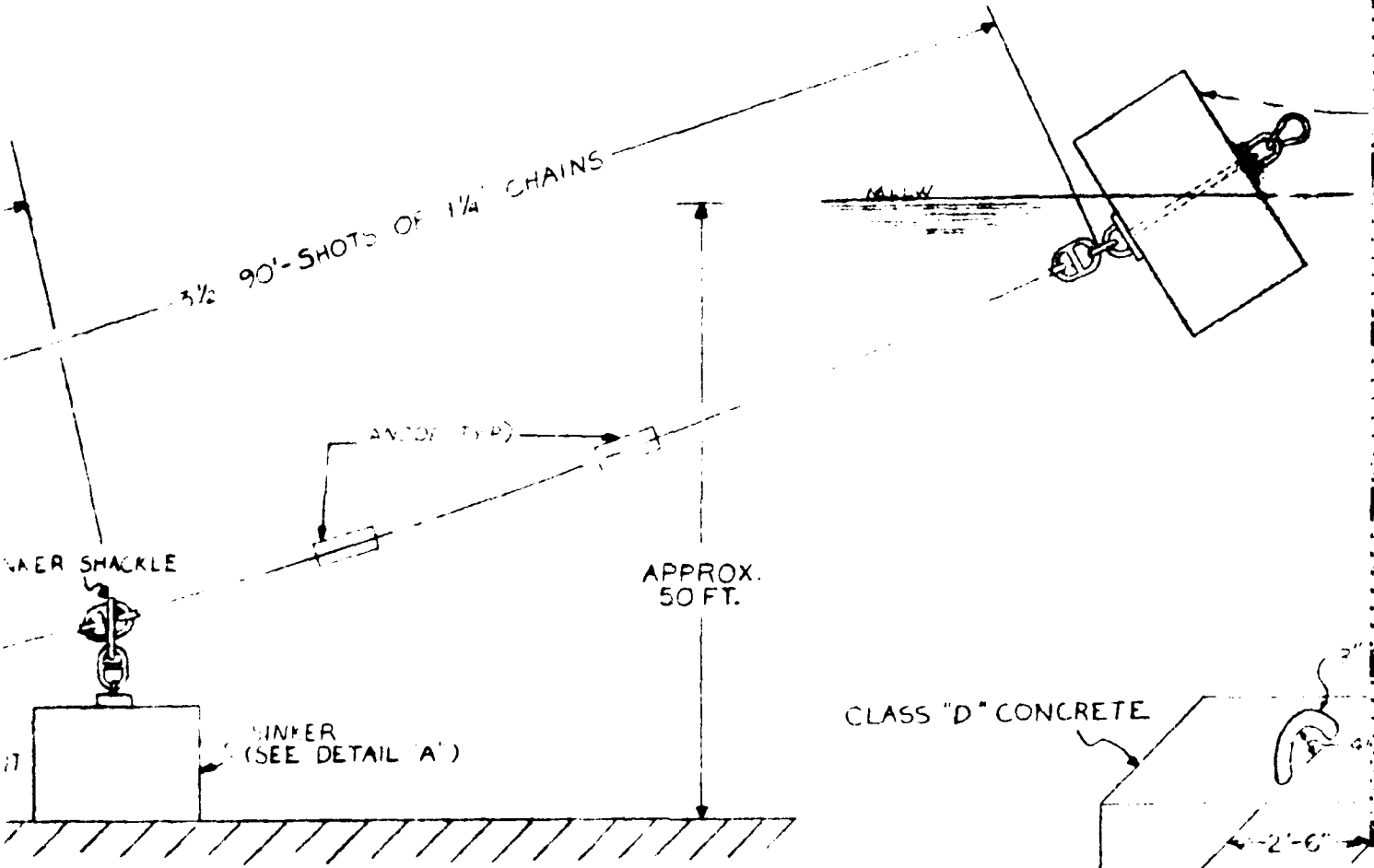
FIGURE 4. PSNSY CLASS A MOORING AS-BUILTS



CLASS F MOORING SYSTEM

(OR OF BARGE MOORING SYSTEM)

NOT TO SCALE



OORING SYSTEM

MOORING SYSTEM)

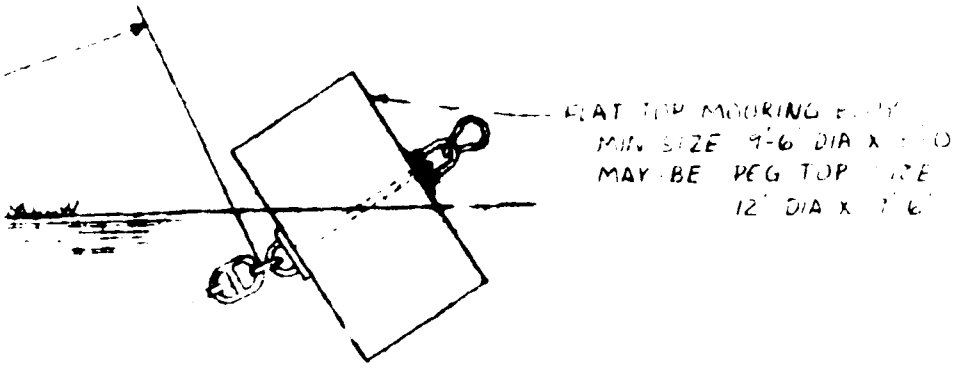
SCALE

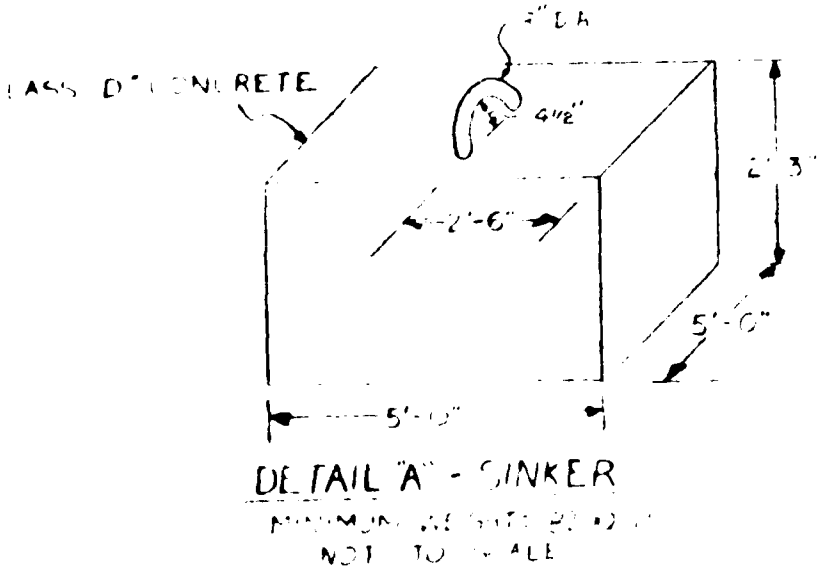
DETAIL "A" - SINK

MINIMUM WEIGHT: 6

NOT TO SCALE

FIGURE 5. PSNSY CLASS F





DETAIL "A" - SINKER

NOT TO SCALE

FIGURE 5. PSNSY CLASS F MOORING AS BUILTS

Standard underwater inspection procedures do not call for the inspection of any part of the mooring which is buried or below a water depth of 130 feet if scuba gear is used. Ground legs and risers are observed only to the point at which they become buried; no attempt is made to locate and inspect anchors or other mooring materials which are not readily visible.

The following paragraphs contain the general inspection procedures that will be followed. For clarification, Figures 4 and 5 are schematic drawings of the as-built configurations of PSNSY's Class A and Class F moorings, respectively.

4.2 **Buoy**. The geographic position of each buoy will be verified. In order to accomplish this, a transit will be used to sight each buoy from known positions ashore.

4.2.1 **Buoy Upper Portion**. The buoy shall be observed to determine its general condition. The size of the buoy (diameter and height) should be recorded along with its freeboard. Physical damage such as holes, dents, or listing shall be described. If the buoy is fiberglass coated, then the fiberglass should be inspected for cracks, wear, peeling, or rust-bleeding. A check will be made to see if the hatches have been fiberglassed over. If the buoy has not been fiberglassed, then the paint will be checked for cracking, chipping, and peeling. Hatches, openings, and penetrations will be examined and broken parts and rust will be reported. Inspection check lists are contained in Annex B.

The buoy fenders and rubbing rails shall be checked for integrity and secure connection to the buoy.

Buoy top jewelry shall be identified and measured with calipers to find the overall outside dimensions and areas of most severe reduction in wire size. Methods for presetting calipers are contained in Annex A.

4.2.2 **Buoy Lower Portion**. Divers shall thoroughly inspect the buoy below the waterline. The thickness of marine growth shall be recorded, three one-foot-square areas shall be selected and cleared of growth without damaging the paint or fiberglass, and the condition of the paint or fiberglass will be noted. If the buoy is a riser-type with a hawse pipe, the presence and condition of the rubbing casting shall be recorded. If the buoy is cathodically protected, the condition, dimensions, and connection of anodes are to be noted. Then, electrical potential readings are to be taken with an underwater voltmeter at three locations on the buoy bottom.

4.2.3 **Bottom Jewelry.** On each mooring, the jewelry connecting the buoy to the riser shall be identified and measured with calipers. As with the topside jewelry, the overall dimensions and the smallest wire size of each type of link or shackle will be recorded.

4.3 **Riser.** Three consecutive double link measurements using pre-cut gauges will be made at both ends and near the center of the riser. Procedures for the use of pre-cut gauges are also contained in Annex A. The swivel and detachable links contained within the riser assembly shall be visually inspected and measured. As the divers swim down the riser, all chain links and other mooring hardware will be visually observed. Material suspected to be in worn or damaged condition will be investigated.

4.4 **Ground Ring.** The ground ring shall be examined for general and localized wear. Caliper measurements shall be made of both the wire size in the region of most severe wear and across the inner diameter.

4.5 **Ground Legs.** Three consecutive double link measurements of each ground leg shall be taken every 20 feet. In those cases where the ground leg chain is slack and not in tension, three single link measurements shall be taken of each selected link as shown in Figure A-1 (Annex A). All connecting hardware including detachable links, anchor joining links, pear links, end links, swivels and shackles shall be identified and measured with calipers. Worn hardware and unusual chain joining practices shall be recorded and photographed.

The legs shall be labeled A, B, and C clockwise from magnetic north and their orientation (determined by the diver's compass) sketched as in Figure 6.

4.6 **Anchors.** If an anchor is located, a pop float shall be attached to it so that the relative positions of the anchor from the mooring buoy can be observed from the surface. The anchor's position shall be recorded. The hardware connecting an anchor to its ground leg will be measured by calipers and the wire diameters recorded.

4.7 **Photography**

4.7.1 **Topside.** Topside photography and ashore photographs are the responsibility of the Engineer-in-Charge.

Photographs will be taken of each buoy showing its general condition. Photographs of the topside jewelry and damaged buoy components will be taken as deemed appropriate by the EIC.

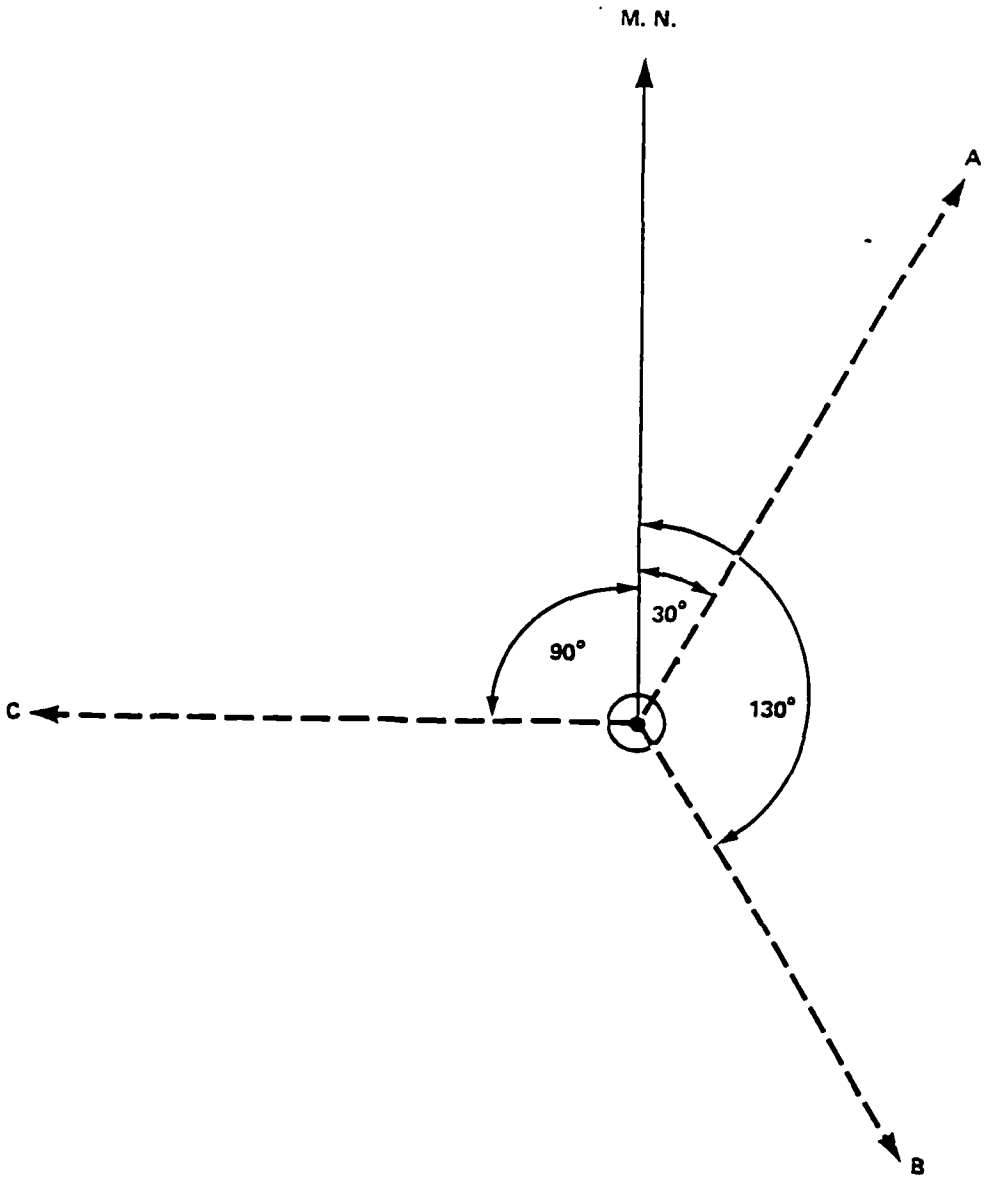


FIGURE 6. MAGNETIC BEARING OF GROUND LEGS

Photographs will be taken of ashore spare mooring material inventories and construction equipment as deemed necessary.

4.7.2 **Underwater.** Underwater photography shall be the responsibility of the dive team. Buoy bottoms, bottom jewelry, worn links, swivels, ground rings, and other hardware shall be photographed wherever required to support material conditions and when environmentally feasible. Photographs shall include clear annotation as to the location of the hardware being photographed.

4.8 **Cathodic Protection.** Any moorings found to have cathodic protection will be inspected using the following procedures.

The underwater voltmeter will be used (after on-site calibration by the dive team) to probe the chain every 15 feet commencing with the buoy and bottom jewelry and continuing until the anchor is reached or the chain disappears into the bottom. All potential measurements will be recorded in the "Comments" column of Figure B-1. Before cleaning, divers will photograph each anode and record the thickness, type and accumulation of the coating. Several anodes should be brushed to remove the oxidation and the length, width and depth of the remaining zinc measured and photographed. Anodes in poor condition should be measured, reported, photographed, and their color recorded.

5.0 DOCUMENTATION

The Engineer-in-Charge will document the inspection procedures used and record the data obtained by the dive team. He may require additional or alternative inspection procedures as deemed necessary during the course of the inspection. He will maintain a time log of events occurring during the inspection, and the master inspection form. In addition, the EIC must be prepared to debrief each diver, upon his return to the surface, in order to gain immediate knowledge of what the diver observed. The information obtained from the divers will be recorded, and this data will subsequently be the basis for the development of the moorings as-built configuration and for the preparation of the Fleet Mooring Inspection Report, which will contain the results of the inspection and recommendations for corrective maintenance actions.

While on site, the EIC will investigate the availability and cost of local mooring maintenance support. In addition he will conduct a cursory inspection of any on-shore Fleet Mooring Inventory (FMI) used for maintenance and repair or ready reserve. The type, size, quantity and general condition of the inventory shall be reported.

6.0 MEETINGS/BRIEFINGS

Upon arrival on site, the Engineer-in-Charge will conduct a pre-dive briefing to familiarize diving personnel with the mooring inspection procedures and to advise them of possible modifications to this inspection plan. In addition, the EIC will give a post-inspection debriefing to advise station personnel of the preliminary inspection findings.

7.0 LOGISTICS

7.1 UCT TWO. All arrangements for messing, berthing, and transportation of diver personnel, and the acquisition of a suitable dive platform/boat, will be the responsibility of UCT-2. In addition, the following equipment will be provided by the divers in support of this inspection:

- All diving support equipment
- Measuring aids
  - Inclinometer
  - 100′ tape measures for use underwater
  - Scales 1, 2, and 3 feet with large numbers suitable for underwater photo documentation
  - Accurate depth gauges
  - Marker tags to relocate or mark chain links or accessories
  - Calipers (24 inch minimum)
  - Go/no-go gauges
- Survey equipment
  - Compass (diver's)
  - Survey buoys with line (pop floats)
  - Surveying transits for establishing mooring buoy locations
- Underwater voltmeters
- Two Underwater still cameras (35mm) with film (color and B & W) and flash with spare batteries
- Cleaning equipment – Hand tools including wire brushes, chipping hammers, sharp chisels, and brushing tools.

7.2 **CHESNAVFACENGCOM.** The CHESNAVFACENGCOM Engineer-in-Charge will provide the following:

- Inspection plan
- Data sheets and forms
- 35mm surface camera and film
- Drafting supplies, graph paper, scales
- Calculator
- Pre-dive briefing data
- DM-26

ANNEX A

MEASURING DEVICES AND THEIR USE

ANNEX A

1.0 MEASURING DEVICES AND THEIR USE

Tables A-1 and A-2 outline the 80 and 90 percent measurements for mooring components. These tables are based on the standard sizes of mooring material listed in DM-26 and can be used to preset calipers before measuring various items. For example, a class BB riser type mooring will require calipers set to 3.15" (90%) and 2.8" (80%) for single link measurements on the riser. These values are then doubled obtaining 6.3" (90%) and 5.6" (80%) for double link measurements on the riser. Similarly, for the ground legs, single link measurements of 2.25" (90%) and 2.0" (80%) are obtained from Table A-1. These values are also doubled to obtain 4.5" and 4.0" for double link measurements. For the ground ring the single link measurements are determined to be 5.85" and 5.2".

The preferred measuring devices, however, are back-to-back 80 and 90 percent "go-no go" gauges. These gauges simplify the diver's job in that, unlike calipers, they have to be damaged to be knocked out of adjustment underwater, and they normally do not have to be reset between dives. The locations for measuring chain links are shown in Figure A-1. Figure A-2 contains the drawings and data required to fabricate these gauges. Although these gauges provide a simpler way of sampling the wire size of chain links and some jewelry, the divers still have to carry calipers to measure ground rings and chain connecting links.

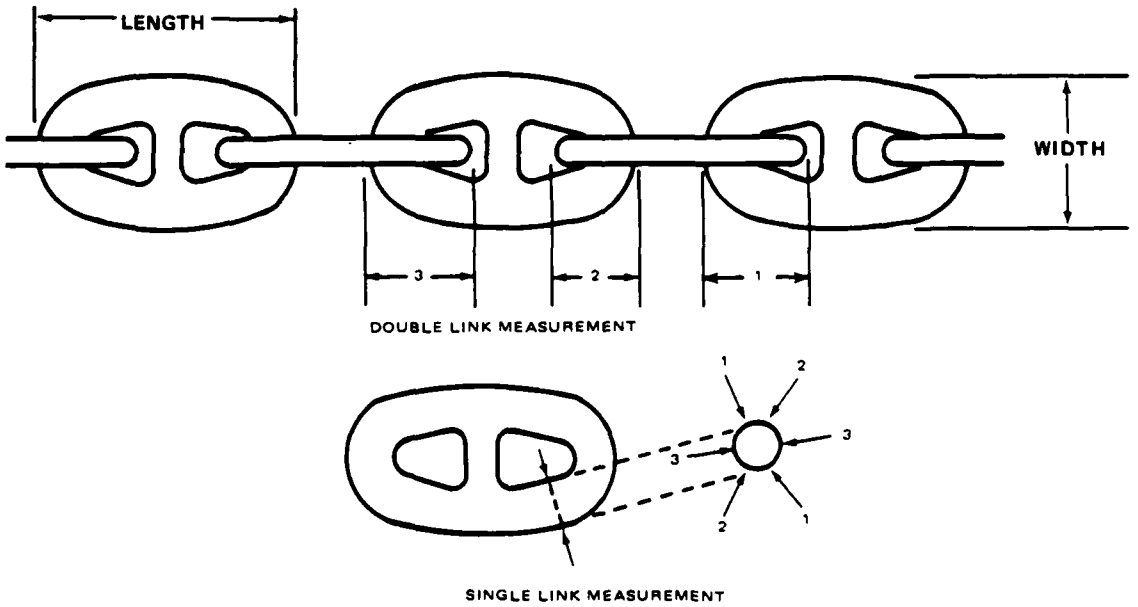


FIGURE A-1. LOCATIONS FOR TAKING CHAIN LINK MEASUREMENTS

TABLE A-1. SINGLE LINK MEASUREMENTS FOR COMPONENTS OF RISER-TYPE MOORINGS (DOUBLE LINK MEASUREMENTS ARE OBTAINED BY MULTIPLYING SINGLE LINK MEASUREMENTS BY TWO)

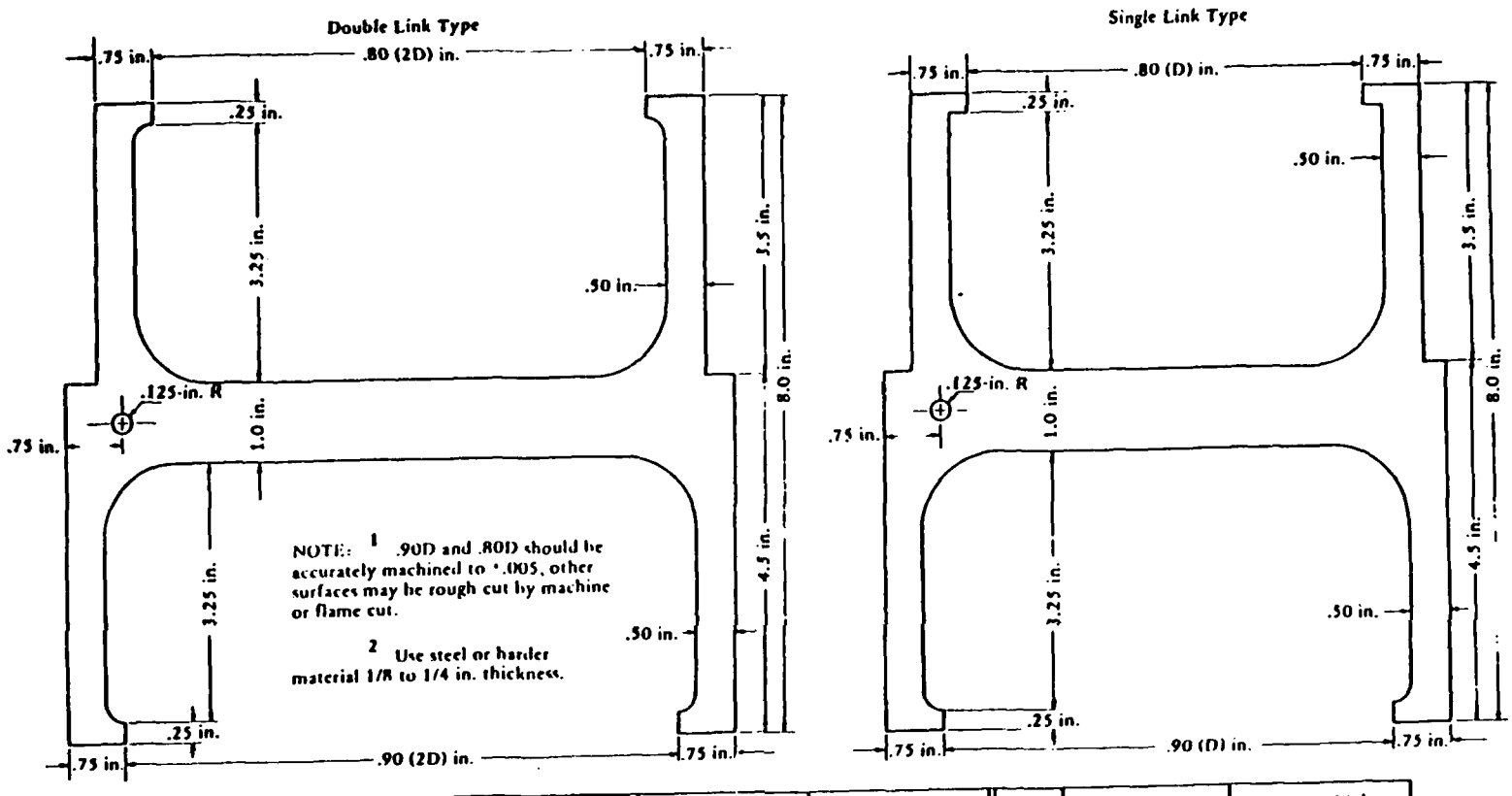
Class Moor ing	Percent Remaining	Top of Buoy			Riser Chain	Ground Ring			Ground Tackle		Anchor[2]	
		F-Shackle	End Link	AJL[1]		AJL[1]	Ring	Spider	Chain[3]	AJL[1]	Stockless w/Stabilizer	LWT
A-A	100	5 3/8	4¼	4"	4	4"	6½	4 3	2 3/4	2 3/4"		
	90	4.838	3.285	type	3.6	type	5.85	3.6 2.7	2.475	type	25,000	-
	80	4.3	2.92		3.2		5.2	3.2 2.4	2.2			
B-B	100	4 15/16	3 15/16	3½"	3½	3½"	6½	4 3	2½	2½"		
	90	4.44	3.544	type	3.15	type	5.85	3.6 2.7	2.25	type	20,000	13,000
	80	3.95	3.15		2.8		5.2	3.2 2.4	2.0			
C-C	100	4 15/16	3 15/16	3½"	3½	3½"	6½	4 3	2¼	2¼"		
	90	4.44	3.544	type	3.15	type	5.85	3.6 2.7	2.025	type	18,000	10,000
	80	3.95	3.15		2.8		5.2	3.2 2.4	1.8			
D-D	100	4 3/16	3 3/4	3"	3	3"	6		3	3"		
	90	3.769	3.375	type	2.7	type	5.4	-	2.7	type	30,000	-
	80	3.35	3		2.4		4.8		2.4			
A	100	3 7/8	3 3/8	2 3/4"	2 3/4	2 3/4"	5½		2 3/4	2 3/4"		
	90	3.488	3.038	type	2.475	type	4.95	-	2.475	type	25,000	-
	80	3.1	2.7		2.2		4.4		2.2			
B	100	3½	3 1/8	2½"	2½	2½"	4 3/4		2½	2½"		
	90	3.15	2.813	type	2.25	type	4.275	-	2.25	type	20,000	13,000
	80	2.8	2.5		2.0		3.8					
C	100	3 1/8	2 3/4	2¼"	2¼	2¼"	4½		2¼	2¼"		
	90	2.813	2.813	type	2.025	type	4.05	-	2.025	type	18,000	10,000
	80	2.5	2.5		1.8		3.6	-	1.8			
D	100	2 13/16	2½	2"	2	2"	4		2	2"		
	90	2.531	2.25	type	1.8	type	3.6		1.8	type	13,000	6,000
	80	2.25	2.0		1.6		3.2		1.6			
E	100	2 7/16	2¼	1 3/4"	1 3/4	1 3/4"	3½		1 3/4	1 3/4"		
	90	2.174	2.025	type	1.575	type	3 15	-	1.575	type	9,000	4,000
	80	1.95	1.8		1.4		2.8		1.4			
F	100	1 3/4	1 3/4	1½"	1¼	1½"	2 3/4		1¼	1½"		
	90	1.575	1.575	type	1.125	type	2.813	-	1.125	type	5,000	2,000
	80	1.4	1.4		1.0		2.5		1.0			
G	100	1 1/16	.1	3/4"	3/4	3/4"	1 7/8		3/4	1"		
	90	.956	.9	type	.675	type	1.688	-	.675	type	3,000	300
	80	.85	.8		.6		1.5		.6			

1. AJL measurement vary according to manufacturer, see DN-26
2. Assumes firm sand bottom
3. Assumes cast steel chain

TABLE A-2. SINGLE LINK MEASUREMENTS FOR COMPONENTS OF TELEPHONE-TYPE MOORINGS (DOUBLE LINK MEASUREMENTS ARE OBTAINED BY MULTIPLYING SINGLE LINK MEASUREMENTS BY TWO)

Class Mooring	Percent Remaining	Top of Buoy		Buoy-to-Ground Tackle			Ground Tackle		Anchor [2]	
		End Link	AJL [1]	D/F-Shackle	AJL [1]	Spider	AJL [1]	Chain	Stocktless/Stabilizer	LWT
A-A	100	4¾	4"	4 11/16	4"	4 3	2 3/4"	2 3/4		
	90	3.285	type	4.219	type	3.6 2.7	type	2.475	25,000	-
	80	2.92		3.75		3.2 2.4		2.2		
B-B	100	4¾	4"	4 11/16	3½"	4 3	2½"	2½		
	90	3.285	type	4.219	type	3.6 2.7	type	2.25	20,000	13,000
	80	2.92		3.75		3.2 2.4		2.0		
C-C	100	4¾	4"	4 11/16	3½"	4 3	2½"	2¾		
	90	3.285	type	4.219	type	3.6 2.7	type	2.025	18,000	10,000
	80	2.92		3.75		3.2 2.4		1.8		
D-D	100	4¾	4"	4 11/16	3"		3"	3		
	90	3.285	type	4.219	type		type	2.7	30,000	-
	80	2.92		3.75				2.4		
A	100	3 3/8	3½"	3 7/8	2 3/4"		2 3/4"	2 3/4		
	90	3.038	type	3.486	type		type	2.475	25,000	-
	80	2.7		3.1				2.2		
B	100	3 3/8	3½"	3½	2½"		2½"	2½		
	90	3.038	type	3.15	type		type	2.25	20,000	13,000
	80	2.7		2.8				2.0		
C	100	3 3/8	3½"	3 1/8	2½"		2½"	2¾		
	90	3.038	type	2.813	type		type	2.025	18,000	10,000
	80	2.7		2.5				1.8		
D	100	3 1/8	3½"	2 13/16	2"		2"	2		
	90	3.038	type	2.531	type		type	1.8	13,000	6,000
	80	2.7		2.25				1.6		

1. AJL measurements vary according to manufacturer, see DM-26
2. Assumes firm sand bottom
3. Assumes cast steel chain



D"	Single Link		Double Link	
	.90D	.80D	.90(2D)	.80(2D)
6-1/2	① 5.85	5.20	–	–
6	② 5.40	4.80	–	–
5-1/2	③ 4.95	4.40	–	–
4-1/2	④ 4.05	3.60	–	–
4	⑤ 3.60	3.20	⑯ 7.20	6.40

D"	Single Link		Double Link	
	.90D	.80D	.90(2D)	.80(2D)
3-1/2	⑥ 3.15	2.80	⑰ 6.30	5.60
3	⑦ 2.70	2.40	⑱ 5.40	4.80
2-3/4	⑧ 2.48	2.20	⑲ 4.96	4.40
2-1/2	⑨ 2.25	2.00	⑳ 4.50	4.00
2-1/4	⑩ 2.03	1.80	㉑ 4.06	3.60

D"	Single Link		Double Link	
	.90D	.80D	.90(2D)	.80(2D)
2	⑪ 1.80	1.60	㉒ 3.60	3.20
1-7/8	⑫ 1.69	1.50		
1-3/4	⑬ 1.58	1.40	㉓ 3.06	2.80
1-1/2	⑭ 1.35	1.20	㉔ 2.70	2.40
1-1/4	⑮ 1.125	1.00		

FIGURE A-2. 10 PERCENT "GO-NO-GO" GAUGES

ANNEX B

SAMPLE INSPECTION FORMS

Figures B-1 and B-2 are two forms the EIC and divers may use to record measurements and as-built summations.

FIGURE B-1

MOORING NO.: _____ CLASS: _____ LOCATION: _____ LAT: _____ LONG: _____

WATER DEPTH: _____ ANCHOR SIZE/TYPE: _____ BUOY TYPE: _____

BOTTOM TYPE: ☐ SAND ☐ MUD ☐ CLAY ☐ CORAL ☐ ROCK Visibility _____ D = depth NI = not inspected, inaccessible

COMPONENTS		NI	CONDITION							COMMENT
			NEW	SINGLE LINK %			DOUBLE LINK %			D	
				90+	80+	80-	90+	80+	80-		
BUOY HARDWARE											
RISER	NEAR BUOY										
	MIDDLE										
	NEAR GRD RG										
GROUND RING											
GROUND LEG NO. A	UPPER END										
	MIDDLE										
	ENTERS BOTTOM										
GROUND LEG NO. B	UPPER END										
	MIDDLE										
	ENTERS BOTTOM										
GROUND LEG NO. C	UPPER END										
	MIDDLE										
	ENTERS BOTTOM										
GROUND LEG NO. D	UPPER END										
	MIDDLE										
	ENTERS BOTTOM										

DATE: _____ ENGINEER-IN-CHARGE: _____ DIVERS: _____

FIGURE B-2

MOORING DATA SUMMARY FOR PREPARATION OF AS-BUILTS

MOORING# _____ CLASS _____ LOCATION _____ DATE _____

BOTTOM TYPE _____ WATER DEPTH _____ MOORING CONDITION _____

ENGINEER-IN-CHARGE _____ DIVERS _____

BUOY TYPE
- DIMENSIONS _____
- CONDITION _____
- TOP HARDWARE _____
- BOTTOM HARDWARE _____

RISER LENGTH
- TYPE CHAIN _____
- LINK WIDTH _____
- WIRE DIAM. _____

GROUND RING LOC.
- OUTER DIAM. _____
- WIRE DIAM. _____
- CONDITION _____

LEG A LENGTH
- EXPOSED LENGTH _____
- TYPE CHAIN _____
- LINK WIDTH _____
- WIRE DIAM. _____

LEG B LENGTH
- EXPOSED LENGTH _____
- TYPE CHAIN _____
- LINK WIDTH _____
- WIRE DIAM. _____

LEG C LENGTH
- EXPOSED LENGTH _____
- TYPE CHAIN _____
- LINK WIDTH _____
- WIRE DIAM. _____

LEG D LENGTH
- EXPOSED LENGTH _____
- TYPE CHAIN _____
- LINK WIDTH _____
- WIRE DIAM. _____

RISER CONNECTIONS _____

LEG CONNECTIONS _____

OTHER _____

ANNEX C

REFERENCES

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

ROUTINE

2103312 AUG 82

FM CINCPACFLT PEARL HARBOR HI

TO CINCPAC PEARL HARBOR HI

INFO CHNAVMAT WASHINGTON DC
COMNAVAIRSYSCOM WASHINGTON DC
COMNAVFACENGCOM ALEXANDRIA VA
COMNAVTELCOM WASHINGTON DC
COMNAVSURFPAC SAN DIEGO CA
COMNAVAIRPAC SAN DIEGO CA
CG FMFPAC
COMOCEANSYSPAC PEARL HARBOR HI
COMNAVMARIANAS GUAM
COMPACMISTESTCEN PT MUGU CA
CHESNAVFACENGCOM SAN BRUNO CA
OICC MIDPAC PEARL HARBOR HI
OICC GUAM
OICC DIEGO GARCIA HOUSTON TX
PWC GUAM
PWC YOKOSUKA JA
PWC SAN FRANCISCO CA
COM THREE ZERO NCR GUAM
NAVPAL CENTERVILLE BEACH CA
NSTA SEAL BEACH CA
NAVSHIPREPFAC SUBIC BAY RP
NF AISUGI JA
NAVSHIPYD PUGET SOUND WA
NSC SAN DIEGO CA
NAVPHIBASE CORONADO SAN DIEGO CA
NAVSHIPREPFAC GUAM
NAVSUPPFAC DIEGO GARCIA
NAVSTA LONG BEACH CA
NSC PEARL HARBOR HI
NAVSHIPYD MARE ISLAND CA
PACMISRANFAC HALANEA BARKING SANDS HI

COMNAVSEASYSCOM WASHINGTON DC
COMNAVELEXSYSCOM WASHINGTON DC
CNR ARLINGTON VA
COMNAVLOGPAC PEARL HARBOR HI
COMSUBPAC PEARL HARBOR HI
COMTHIRDFLT
COMMARCORBASESPAC CAMP H M SMITH HI
COMNAVFORJAPAN YOKOSUKA JA
COMUSNAVPHIL SUBIC BAY RP
PACNAVFACENGCOM PEARL HARBOR HI
CHESNAVFACENGCOM WASHINGTON DC
OICC SUWESTPAC MANILA RP
OICC FAR EAST YOKOSUKA JA
PWC PEARL HARBOR HI
PWC SUBIC BAY RP
PWC SAN DIEGO CA
COM THREE ONE NCR PORT HUENEME CA
UCT TWO
NAVOCEANSYSCEN SAN DIEGO CA
NSD SUBIC BAY RP
MCAS IWAKUNI JA
NAVUSEAWARENGSTA KEYPORT WA
NAVMAG LUALUALEI HI
SUBASE BANGOR WA
NAVPHIBASE CORONADO SAN DIEGO CA
NAVSHIPREPFAC GUAM
NAVSTA SAN DIEGO CA
NAVSHIPYD PEARL HARBOR HI
SUBASE PEARL HARBOR HI

BT
UNCLAS //N11000//

SUBJ UCT TWO FY83 EMPLOYMENT TASKING

DLVR:CHESNAVFACENGCOM WASHINGTON DC(9)...INFO

RTD:000-000/COPIES:0009

114776/235 1 OF 3 MI 0308 235/23:21Z 2103312 AUG 82
CSN:RADY00304 CINCPACFLT PEARL HARBOR HI

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

A. CINCPACFLT PEARL HARBOR HI 260654Z JUN 82

1. REF A REQUESTED NOMINATIONS OF PROJECTS FOR UCT TWO ACCOMPLISHMENT FY83-85. FROM THE RESPONSES TO REF A THE FOLLOWING PROJECTS ARE TASKED FOR ACCOMPLISHMENT IN FY83:

A. CENTERVILLE BEACH (CLASSIFIED)
B. ARCTIC WEST (CLASSIFIED).
C. BARKING SANDS, HI, CABLE LANDING AND REPAIRS
D. WPNSTA SEAL BEACH, DEMOLISH ANAHEIM BAY BRIDGE
E. NSD SUBIC, PILE REPAIR POL PIER
F. NSD SUBIC, PILE REPAIR MARINE TERMINAL PIER PHASE I (REPAIR ALL SEVERE AND MAJOR DAMAGE)
G. NAVSHIPREPFAC SUBIC, INSPECT ALAVA WHARF
H. FLEET MOORING INSPECTION - PACIFIC DATA BASE (PEARL HARBOR HI, GUAM, YOKOSUKA, IWAKUNI, SASEBO, INDIAN ISLAND WA, BREMERTON WA)
I. NAVMAG LUALUALEI, INSPECT AMMO PIERS W1-5
J. UNDERWATER INSPECTION PROGRAM (NSC SAN DIEGO)
K. SUBASE, BANGOR WA, UNDERWATER INSPECTION
L. TRIREFFAC BANGOR WA, UNDERWATER MSF RANGE REPAIR
M. DEGAUSSING RANGE SURVEY, SAN FRANCISCO CA
N. NAVPHIBASE CORONADO SAN DIEGO CA, PIER INSPECTIONS

2. THE FOLLOWING PROJECTS ARE TASKED AS FILL IN WORK FOR FY83:

A. UNDERWATER INSPECTION PROGRAM (NAVSTA PEARL HARBOR)
B. NAVUSEAWARENGSTA KEYPORT WA, INDIAN IS PHASE TWO MOORING
C. NSD GUAM, REPAIRS TO SIERRA WHARF GUAM. REQUIRES COORDINATION WITH ON SITE NMCB FOR ACCOMPLISHMENT.

THE FOLLOWING PROJECTS ARE TENTATIVELY TASKED FOR ACCOMPLISHMENT AS INDICATED:

A. FY-84
(1) ARCTIC WEST (CLASSIFIED)
(2) NAVSHIPREPFAC GUAM, REPAIRS TO LIMA WHARF
(3) FLEET MOORING INSPECTION - PACIFIC DATA BASE 9SUBIC BAY, NSF DIEGO GARCIA, PWC SAN DIEGO, NAVSTA SAN DIEGO, WPNGTA SEAL BEACH, NAVSTA LONG BEACH)
(4) NSD SUBIC, WATERFRONT FACILITIES INSPECTION
(5) NSD SUBIC, MONOBUOY FUEL LINE REPAIRS
(6) DEGAUSSING RANGE SAN FRANCISCO, RANGE INSTALLATION
(7) UNDERWATER INSPECTION PROGRAM CNAVSHIPY PEARL HARBOR, NSC PEARL HARBOR, SUBASE PEARL HARBOR)
(8) SCARF REPAIR/INSPECTION
(9) BARKING SANDS, UNDERWATER RANGE REPAIRS
(10) NSD SUBIC, PILE REPAIR MARINE TERMINAL PIER PHASE 2

(REPAIRS TO MODERATE AND MINOR DAMAGE)

B. FY-85

(1) ARCTIC WEST (CLASSIFIED)

(2) BARKING SANDS - UNDERWATER RANGE WORK

(3) FLEET MOORING INSPECTION - PACIFIC DATA BASE (PEARL HARBOR HI, GUAM, JAPAN, PUGET SOUND WA)

(4) UNDERWATER INSPECTION PROGRAM (MARE ISLAND CA)

(5) SUBASE PEARL, MCON P-086, REPAIR AND EXTEND SEAWALL. THIS PROJECT WILL REQUIRE SEPARATE TASKING OF AN RNMCB, CBU, OR OTHER ORGANIZATION AS "PRIME CONTRACTOR" FOR PILE DRIVING AND TOPSIDE ZONE WITH UCT ACCOMPLISHING IN WATER SUPPORT.

END

FILMED

6-86

DTIC